

Pro/File 2068

The Associative Data Base

Special Supplement
for the
Pro/File Cartridge

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INTRODUCTION TO THE CARTRIDGE PRO/FILE 2068

During the period that the original cassette version of Pro/File has been out, many improvements have been suggested by owners. This cartridge version, in addition to making use of the 2068's bank switching mechanism, also incorporates many of these advancements which all contribute toward making the cartridge Pro/File far more flexible and easier to use than the original. Besides just improving upon old features, the new Pro/File adds several totally new capabilities which now let you do things you could only dream about with the old Pro/File. I am just delighted with the way this cartridge version has turned out.

These pages detail all commands, functions, and procedures of the cartridge program which are added or changed from the original description which appears in the big Pro/File book. If you already are familiar with the cassette version, you will have no trouble adapting to the new enhancements. For those of you who are first time owners, read the book first. Then, come back to these directions to find out what new features have been added.

GETTING STARTED

First, be sure the computer is turned OFF. Lift the Timex Command Cartridge door to the right of the keyboard, and plug the Pro/File cartridge into the socket. Press it firmly so it goes all the way in, thereby enabling you to close the door completely over the board.

Now turn the computer ON. The computer screen will flash its normal initialization pattern, and then briefly display the Pro/File "title screen" while Pro/File kicks itself into operation. In about a second, Pro/File's main menu will appear on your TV or monitor.

CHANGES IN THE MAIN PRO/FILE MENU

First note that you can now enter multi-word search commands which are comprised of search words separated by the tokens AND, OR, and NOT. In the original program, you could search for records which contain word-1 AND word-2 AND word-3 etc. In this new program, you can now search for word-1 AND word-2 NOT word-3 OR word-4 AND word-5 etc. Remember to use the tokens to separate search words. Don't spell it out like N-O-T.

Next, notice the "status" block which tells you that total file capacity is now 37,000 bytes. The increased capacity over the tape version is a benefit of being able to store Pro/File's Basic in the cartridge instead of in RAM memory.

A new status label called "TALLY" is added that tells you which line of a record the computer will look at when it performs arithmetic on numbers you store as data. On page 107 of the Pro/File Book, you'll find details on adding the ability to perform math functions on numbers you store on the top line of each record. This cartridge version includes this ability and extends it handle to numbers stored on any line thereby removing the restriction of where you must place your numbers. This also makes it possible to store more than one pair of values in each record. The computer can keep everything separate.

Quite a few additions appear in the "command options" which follow the status display. Because every one is either new or upgraded over the original tape version, I will cover each in turn.

COMMAND OPTION CHANGES

Enter "A" to ADD files: This command, as in the cassette version of Pro/File, puts you in the ADD/EDIT mode with the blinking cursor. As before, you can type in a new record and all of the old edit commands work as described in the Pro/File Book. In addition, the audible "tick", the lprint while in ADD/EDIT, and the EDIT to NEXT entry enhancements shown on pages 101, 103, and 104 of the big book are included. They work exactly as described. While you are adding or editing a record, you can press the token "THEN" to lprint what you have on the screen, or you can press "STEP" to automatically close the file, and go to the next one. It should be noted that if you are ADDing a new record, pressing the STEP token, will close the file and put you right back in the ADD mode so that you can add a new record. If you are EDITing an existing record, pressing the STEP token will close the file, and go to the next record in your data but you will not be in the edit mode. Instead, you will see the next record displayed on the screen with the display options so you can press "E" to EDIT only if necessary. Use of the STEP token presents other interesting possibilities when used in conjunction with a new display option called "AA" which duplicates a displayed record. Details of this will be covered in another section.

SAVE or LOAD: In this cartridge, entering these commands will save or load only the data you have added--not the entire program as is the case in the old Pro/File 2068. Because just the data you have added is saved or loaded, the time required is significantly shortened, and is directly proportional to the amount of data you have in the program. Just for kicks, type SAVE immediately after you turn on the computer. The save is virtually instant because there is no data in your file. Remember though, the more records you add, the longer it takes. Also note that the verify feature given on page 100 has been included. After every save, the computer tells you to rewind the tape and play it back into the computer if you want to verify it. If you do not wish to verify the tape, you can press BREAK to cause the computer to quit the verification procedure and return you to the main menu. If a verify results in a tape error, or if you press Break to exit the process prematurely, the screen will flash a "VERIFY ERROR" message on the screen. This should alert you to check your equipment and save again before you turn off the computer. The "ERROR" message will turn off if you press just ENTER at this point, or if you execute some other command from the main menu.

AUTO for AUTOSEARCH: This function incorporates a much faster machine code sorting procedure than the Basic sort which was present when Pro/File first came out. Because the new procedure was described very thoroughly in an addendum to the program entitled "BREAKTHROUGH!", I shall not go into the specifics of the autosearch here. Instead, read the separate BREAKTHROUGH newsletter which is inserted in the Pro/File Book.

DEFP for PRINT FORMAT: As before, this command allows you to specify lines of a record to be printed for hard copy. This is done by typing line numbers separated by slashes (/) to cause printing drop to down one line on the paper. Unlike the original, this version lets you use a period (.) between line numbers too. The effect on paper is very different. When you define print format, separate line numbers with a period to cause printing to be carried out on the SAME line on the paper. Use the slash to drop down a line as before. For example, if you define printer format to be: 1/2/3.4/5, the result on paper would look like this:

```
line 1
line 2
line 3           line 4
line 5
```

Now you can print more than 32 columns on a line if you use a big printer! In addition, if you enter the number "16" somewhere in your print format, the current COUNT and TALLY data will be printed in the appropriate position. As before, you can enter "0" instead of a regular line number to print a blank line.

"M" FOR MORE COMMANDS: So many new commands were added, they wouldn't fit on one screen, so you can press "M" to toggle between one of 4 sets of command options. Whatever display happens to be on the screen has no bearing on which command you can enter at a specific time. In other words, you can Press -A- to ADD a new record even if the ADD command is not shown on the screen. The different displays are simply there to remind you of your options.

PSAVE or PLOAD: These commands are similar to the SAVE or LOAD options except rather than just operate on the data you have stored, they will save or load an entire program and data. It is possible to add your own program lines in RAM memory and have Pro/File run them. Once you have added such lines, it is necessary to provide some way to save them onto tape so they can be loaded back into the computer. PSAVE and PLOAD accomplish this.

\D APPENDED TO A SEARCH COMMAND: It was previously mentioned that it was possible to perform arithmetic on numbers stored in records. By entering a search command with "\T" added to the end, the computer will search for every record which contains a match to the search command and add the numbers it finds on the line specified in the TALLY status label. If for example, TALLY is set to 1, and your search command is "electricity\T", the computer will search for "electricity" and display the first record it finds to contain this word. If the first line of the record has a number in it, the computer will remember the value found there and add it to the numbers stored on line 1 of other records which also match with the search command. As matches are found, the current record as well as the current total will be displayed on the screen. Actually, the computer is capable of handling not one but two separate numbers on any given line. They can appear anywhere on the specified line as long as the first number is on the left hand side of the screen and the second number is on the right hand side (at least 16 columns over to the right). As the computer sums the numbers, the current totals will be listed on the screen as "CNT" meaning the total number of records thus far found by a search, "SUM1" which is the total for numbers on the left hand side of the specified line, and "SUM2" equalling the total for numbers on the right side of the specified line.

Read the Pro/File Big Book starting on page 108 to find out how numbers can be incorporated into your data. The program gives a great deal of latitude in choosing how and where numbers are placed, or even that numbers be placed at all. However, there are a few combinations you should avoid. These cautions (and remedies should you work yourself into a jam) are covered on pages 108-109.

"\D" APPENDED TO A SEARCH COMMAND: If you follow the sequence of inputting search command followed with "\D", the computer will BLOCK DELETE every record which matches the search command. If, for example, you use Pro/File to store a mailing list, you could enter the search command: NJ\D to block delete every person from New Jersey. This is a very powerful command which can also be the source of much aggravation should you accidentally misuse it, so be careful; especially when you use it in conjunction with multi-word searches. Read more about this function on page 106 of the big book, and also in these pages under the section titled "More About Multi-Word Search Commands."

RST to RESTART A DATA BASE: If you enter this command in place of a search command, the computer will clear out the entire data base and return you to the main menu with OPEN equal to 37,000 bytes. All other features of the program (file name, order line, tally line, print format, etc.) remain unchanged. This is in contrast to simply turning off the computer and then turning it back on which is another way to start a new data base, but here, file name, order line, tally, and DEFP are also reset to their default values.

"NN" for NEW NAME: If you decide to change the name listed on the main menu next to the FILE status line, enter "NN" instead of a normal search command. The computer will then ask you to input a new name after which, it goes back to the main menu with the new name you input listed in the FILE status line. When the computer is first turned on, the name, "NO NAME" is given to the empty data base. By entering the "NN" command, you can change this to any name you wish as long as it is not more than 10 characters in length. This length limit is imposed because when you SAVE your data, the name you enter as a file name is used as the name under which the data is saved. The computer's ROM restricts names for saving to 10 characters, so we must keep file names within this limit.

CPR to CONFIGURE PRINTER: When you use this cartridge Pro/File with a full size dot-matrix printer, you must enter the CPR command before you try to do any lprinting. This command lets you tell the computer which brand of printer interface you use thereby enabling one of the 7 built-in print drivers. If you do not issue the CPR command, the program will automatically print out to the TS2040 printer. If you use a big printer, you have at your disposal all of the features and benefits of the "UP-ARROW" print driver which is detailed on page 115 of the big book. Unlike the original tape version of the program, this "UP-ARROW" driver is set up as a new channel (channel #5) so that if you wish to llist program lines you may have added to RAM, you can do so simply by using the LLIST command in Basic. Such program listings, however, will be directed only to the TS2040 printer unless you load in separate print driver software to run your big printer interface. This is necessary because the Pro/File print drivers (activated in your RAM program lines with "LPRINT #5;...") are not designed to spell out the tokens which are present in Basic program listings.

"<=" for CUSTOM COMMANDS: This token (symbol-shift Q) will cause the computer to switch OFF the Pro/File cartridge and begin executing program lines you might add to the HOME bank of RAM memory. When you run Pro/File, your custom program lines will not be executed until you enter a search command at the main menu which begins with the "<=" token. It is important to note that you can go to your custom program lines by entering just "<=", or by entering any string of characters which begins with "<=". Therefore, it is possible to pass parameters from Pro/File to your custom program. For example, you could enter a search command such as, "<=SEND". When you do, Pro/File turns itself off and the computer looks for lines to run in the home bank of memory. The search command (which is found in a string called X\$) is "<=SEND" so you could incorporate a line such as:

```
10 IF X$("<=SEND") THEN GO TO 100
```

This would make the computer run lines starting at 100 only if you add the SEND command when you type in the search command.

Once the computer is in the home bank, it stays in the home bank until you tell it to go back to the cartridge. To illustrate this, try the following experiment. First, turn on the computer and wait for the main menu to appear. Then enter the "<=" token as a search command. When you do, the computer will stop with the report 0 OK, 106:4. At this point the computer has stopped running the cartridge. It also stopped running the home bank because there were no program lines to execute!

Now enter these program lines:

```
10 IF X$("<=") THEN STOP
20 PRINT "HELLO": PAUSE 60
30 POKE 23750,128: GO TO 1
```

Line 30 is the key to going back to the Pro/File cartridge. When you POKE 23750 with a 128, the cartridge will be turned back on and all Goto's will refer to program lines in the cartridge. If address 23750 is poked to a zero, Pro/File will turn off and Gotos will refer to lines in the home bank.

Enter the command GO TO 30 to go back to the cartridge. The Main menu will come up and you can try out the custom commands you just added to the Home bank. First, enter a search command like "<=PRINT". This will cause line 20 above to execute followed by 30 which takes you back to the Pro/File menu. Now try entering the search command "<=". Here, line 10 above will cause the computer to stop.

You will discover when you first look at program lines in the home bank, that there already exists a single REM line. Pro/File puts this line here when it initializes, and it stores printer and keyboard channel information. Do not delete this line or you will crash the computer when you go back to the cartridge program.

There is not a lot of free ram available in which to write lengthy Basic programs. You have about 700 bytes. This feature is added to Pro/File to enable you to patch in short snips for special purposes. It was not intended to provide for simultaneous running of two major programs. Keep your custom commands short.

TALLY command to CHANGE TALLY: Earlier, I mentioned that you could place numbers anywhere in a record and have the `\T` function add it to numbers in the same position in other records. The TALLY status display on the main menu tells you which line the computer will look at as it hunts for numbers to add. At the beginning, line 1 is always automatically chosen. You can, however, change this by typing in the word TALLY in place of a search command. When you do this, the computer will ask you to input a new line number. It will be displayed in the TALLY status indicator after it is entered.

MERGE to MERGE DATA: Enter MERGE when you want to combine a file on cassette with what is already loaded into memory. This command works like the data load command except that you combine two files rather than replace one with the other. This command works only with data that has been saved on cassette, and you must be careful not to try to add more data than space allows. You have a total capacity of 37000 bytes which must not be exceeded. The MERGE function loads new data from tape onto the end of what already exists in memory. After merging two files together, the program inserts a short file between the old and the new which says, "New Data Begins". Therefore, when you are stepping through your newly merged file, you can tell where the old data ended and the new began. This short indicator can be deleted in the normal way if it is not needed.

COLOR to CHANGE COLOR: When Pro/File first comes up, it gives you a color display. If you use a black and white TV set or a monochrome monitor, you may achieve a better picture by turning the color display off and selecting either white letters on a black background or black letters on a white background. This selection is accomplished by entering the word "COLOR" at the main menu. When this is done, the program asks which display you want and you respond by entering a "C" for COLOR, "B" for BLACK INK, or "W" for WHITE INK. Color selection can be changed at will. Experiment.

CHANGES IN THE DISPLAY OPTION MENU

After information has been added to Pro/File's memory, you can retrieve data by searching for it (entering a Search Command). When the computer displays a record, it also prints the "Display Option Menu" at the bottom of the screen. These options let you do different things with the data you have. In addition to all the options provided in the original cassette version of the program, you also have these new options:

"R" to REDO- This is the same as the old "Return to previous files" option. Only the menu description has been changed. This was done for compactness. As before, when you enter "R", the computer will search for the same search command which was last entered.

">" prefix for MIDSEARCH- The best way to describe the MIDSEARCH function is to give you an actual example. Suppose you have merged two stamp collection files into one and you want to look at the second file one last time before you reorder the entire big file. You can do this using the MIDSEARCH. First, search for the "New Data Begins" record by entering a search command such as "New Data". When this record comes up, invoke the MIDSEARCH function by entering a new search command prefixed with the ">" symbol (such as ">*"). This will cause the computer to find every record AFTER the "New Data Begins" record.

The MIDSEARCH function will search for all files matching a new search command which come AFTER the record displayed when the MIDSEARCH is invoked. Another example: Suppose you are printing out your mailing list on labels and your printer jams just 20 names from the end. If this were the case in the cassette version of Pro/File, you would have to completely redo the entire process and waste all the good labels that were printed. With the cartridge version of Pro/File, this is no longer a problem. When your printer jams, all you have to do is note the name on the last good label. Then search for it to bring it to the display. Finally, start the MIDSEARCH from that point on. You are not restricted to searching for ALL files after a given point in the middle of your data (which is what occurs when you use a command like ">*"). You can also use ">Smith" to find all Smiths after a certain point, or ">*NOT Smith" to find everything EXCEPT Smith after a given point.

"T" to LPRINT TALLY- If you are running a search using the "\T" option to tally numbers stored in records, you can enter "T" to print out the current totals on your printer. Only the tally information will be printed. The record itself will not go to the printer. To lprint the displayed record, use the "C" option.

"AA" to DUPLICATE- This command works like the "E" to Edit function. Pressing "AA" and Enter will put the computer in the ADD/EDIT mode with the blinking cursor. The "AA" command, however, will make a second copy of the displayed file whereas the "E" command will not. If you add many different records which are all very similar except for a few minor changes, the "AA" command will permit you to duplicate a displayed record without destroying the original. You can make your minor changes to this new record and eliminate the need to retype all the redundant information. Another area in which the "AA" command will prove to be useful is where you are entering records which must have specific information on certain lines, but you can never remember which line holds what information. Suppose you use Pro/File to store client information. You could add a record which looks like this:

Zip
Name
Addr
City/St
Date

You could search for this file using "Zip" as a search command. When you see it displayed, you could then type "AA" to put you in the ADD/EDIT mode. Once the cursor starts blinking, you can simply overwrite the labels telling you where specific information is to be located. In a "field oriented" data base, the labels or names you assign to each field would be the rough equivalent of the ZIP record shown above. Unlike a "field oriented" data base, however, Pro/File does not limit you to just one set of fields. You could set up a ZIP record, a STAMP record, and a CALENDAR record, each with its own set of labels.

Here's a tip if you are adding a large number of records at one sitting. Call up your LABEL record and enter "AA" to duplicate the labels as mentioned. After adding information, use the STEP key to close the file rather than STOP. What happens here is that the Label file will return to the screen and the computer will wait for you to press "AA" again. If you close using the STOP key, the computer returns to the main menu, and you must enter a search command to call up the Label file again. Use of the STEP key saves keypresses.

OTHER COMMAND OPTIONS FROM THE DISPLAY OPTION MENU

With one exception, all of the command options displayed in the main menu can also be entered from the display option menu. These are the commands like NN, RST, DEFP, COLOR, TALLY, etc. The exception is AUTO which must be entered from the main menu only. In the cases of CPR, DEFP, NN and TALLY, parameters can be altered without changing the record which is displayed on the screen. You might wish to lprint a record in several different formats. With this feature, you could search for the desired file, change printer format using the DEFP command, print the file, change DEFP again, and print the file a second time.

MORE ABOUT SEARCHING

The cartridge Pro/File's expanded AND, OR, and NOT search capability deserves a bit more explanation because the tremendous increase in power these separators give you in selecting data can also be a source of confusion if you do not use them correctly. When applying AND, OR, and NOT logic to find a particular group of records, it is necessary to first define what is meant by the terms. Ground rules must be established, and proper syntax must be adhered to. When we search for -A- NOT -B-, do we mean search for everything which contains -A- and everything which does not contain -B-, or do we mean search for everything which contains -A- except those which also contain -B-? Both arguments are valid. It becomes a question of semantics. We simply need to decide which it shall be. The paragraphs that follow describe the syntax and definitions I arrived at when I wrote the program. You will find when you experiment with various combinations of search commands that a search will always adhere to the rules I have laid out. As you learn the rules, you will probably be surprised at the results you obtain from a given search command. However, if you think about it, you will find that the computer has functioned properly. I have tested this search mechanism for many months and have yet to discover a case where the computer produced improper results. So far, every time I did not get the data I thought I should get, it was caused by me not entering the search command properly. So here are the rules:

First, please refer to page 20-21 of the big Pro/File book and note the one situation where a multi-word search will not find a file properly. If you have a record like:

Peter Smith
123 Main St.
Washington DC
20011

Pro/File will let you use multi-word search commands such as "Smith AND Washington" to find it, but if you search for "Smith AND 20011" the computer will not display the record.

WHEN THE LAST WORD OF A RECORD MATCHES THE SECOND, THIRD, FOURTH, ETC. WORD OF A SEARCH COMMAND, THE RECORD WILL BE MISSED.

Pages 20-21 of the big book show several ways to avoid this potential pitfall.

"AND" SEARCHES

When you search for Word 1 AND Word 2 (such as Smith AND NJ), you are telling the computer to find only those records which contain BOTH Word 1 AND Word 2. The computer begins looking through all its data for records which contain Word 1 (Smith). When a record is found, it then scans just that record for a match with Word 2 (NJ). If the second word is present in the record it means that both Word 1 AND Word 2 are in the record, so the computer displays it on the TV screen. More AND separators in a search command simply cause the computer to check the record further for more matches. The record will be displayed only if all words are present in the record.

"NOT" SEARCHES

The NOT separator is the exact opposite of AND. In a search command such as "Smith NOT NJ", the computer first finds a file which has Smith in it. Then it checks the record further to see if it contains the word "NJ". The record will be printed only if it does NOT contain the second word. Like the AND search, additional words separated by the NOT token can be entered. A record will be displayed only if the word following NOT is absent from the record being checked.

When using a search command which combines both the AND and NOT separators (Smith AND NJ NOT Trenton NOT Atlantic City), a record will, as previously mentioned, be displayed only if every criterion is met. If the above search command is entered, it would find only those Smiths from NJ who do not live in Trenton and who do not live in Atlantic City. One might think of this search as being for Smith AND NJ NOT (Trenton OR Atlantic City), however this can lead to confusion; especially when an OR token is used to make an OR search. A better way to envision the NOT search is to say "but not" after the first NOT token, and say "and not" when you type in the second, third, or fourth NOT tokens. Therefore, the above example could be stated as "Smith AND NJ (but) NOT Trenton (and) NOT Atlantic City.

If you want to search for all records EXCEPT New Jersey, you might be inclined to simply enter a search command like "NOT NJ". This is incorrect syntax, however. The Pro/File big book tells you that you can search for ALL records by entering an asterisk (*) as a search command. To find ALL records except NJ, therefore, you should enter this: "* NOT NJ". In other words, this commands says "all records, but not NJ."

"OR" SEARCHES

AND and NOT are similar in that they both work on the same record. A record being checked will be displayed only if the words accompanying the AND and NOT separators fit the logic of the search command. The OR token is different in that it works on separate records. If I give you a phone book and ask you to find all Joe Smiths OR Pete Smiths, one way you might find them would be to first find the Joes and jot down their numbers. Then you look for the Petes. This is the way Pro/File handles the OR search. When you search for Word-1 OR Word-2, the computer produces displays of every record which contain word 1. Then it displays every record which contains Word-2. Thus, a search for "Smith OR NJ" would find every Smith and everyone from New Jersey.

When you use the OR token, think of it as being a divider of the search command. Everything in front of (or to the left of) the OR token will be found first. Then everything which follows (to the right of) the OR token will be found. It is quite possible to combine AND and NOT with the OR divider. Such a case might be "Smith AND NJ OR Jones AND MD". This search command would result in displays of all records which contain BOTH Smith AND NJ and also all records which contain BOTH Jones and MD.

Pro/File's use of the OR divider strays somewhat from natural human reasoning. For example, to find all Smiths from NJ or MD, you might think that the search command, "Smith AND NJ OR MD" would give you what you want. This is not the case, however. Referring to the rules defined above, this command would in fact find everyone named Smith from NJ and also everyone from MD even if their name isn't Smith. The proper way to find every Smith from NJ or MD is to enter the command "Smith AND NJ OR Smith AND MD".

Can you see how the OR token splits the command into two separate ones? First the computer searches for "Smith AND NJ". Then it finds "Smith AND MD". You can put as many OR tokens in a search command as you want. Each one will divide the total command another time. For example, "Smith OR Jones OR Frazier" will cause the computer to first find all Smiths, then all Joneses, then all Fraziers. AND and NOT can also be used with OR, but you must remember that AND and NOT will apply only to the words on one side or the other of the OR token. In other words, the computer will search first for any combination of AND's and NOT's on the left side of the OR divider. Then it will do the same on the right side.

MULTI-WORD SEARCHES & THE BLOCK DELETE FUNCTION

Search Commands separated by AND, OR, and NOT can be tied to the BLOCK DELETE function by making the last two characters of the search command "\D". The computer will search for matches to your command and delete them automatically. In general, this is a very simple and straightforward procedure. However, you must use extreme care when using the OR divider in the BLOCK DELETE mode. I discovered this very graphically when I tested this function out on a large list of names and addresses. I wanted to delete every person in the list except those from New York City or Brooklyn. I entered the command:

```
* NOT New York OR * NOT Brooklyn\D
```

This, I reasoned, was the proper way to search for everyone who was not from New York or Brooklyn so all I had to do was append the search command with "\D" to delete them. Much to my surprise, I ended up deleting everybody, including those from New York AND Brooklyn. At first I thought there was a bug in the program which caused this, but after thinking more about my search command I realized that the computer did exactly what I told it to do. How could this be?

Remember that the OR token divides the search command into different components. In the example above "*** NOT New York**" is separated from "*** NOT Brooklyn**". First the computer went through the data and deleted every person not from New York. People from Brooklyn were deleted because they are NOT from New York. After this part was finished, the data base held only those people from New York. Then the second half of the OR search was carried out: delete everyone NOT from Brooklyn. Since the data base did not have anyone from Brooklyn at this point, the computer deleted everybody and I was left with an empty file! The computer reasoned this out flawlessly. It was my mistake that I told it to do the wrong thing.

Now the question arises, how DO you block delete everyone not from New York City or Brooklyn? The trick is to avoid the OR token. To accomplish the task properly input this:

*** NOT New York NOT Brooklyn\D**

The result will be a data base which consists of just those people from New York or Brooklyn.

USING THE CARTRIDGE WITH AN IBM KEYBOARD

Hidden inside the cartridge is software which will let you use your computer with a standard replacement keyboard for the IBM PC or PC/XT computer such as the Keytronics model 5151. If you ever feel the need to upgrade to a more useable keyboard, you can, and you won't need to change the cartridge to do it. On the other hand, if you're quite happy with the Timex keyboard, you can ignore this section. Details below show how to hook the full size keyboard up and how to use it both with Pro/File and with your own Basic programs.

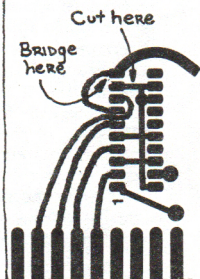
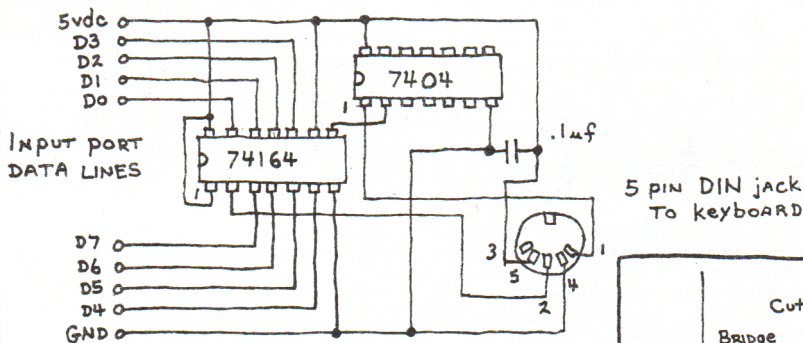
The IBM style keyboard is connected to the 2068 through the Experimenter's Universal Input/Output Port which is available from me, Tom Woods, Box 64, Jefferson, NH 03583. A small change must be made to the board and a little additional circuitry must be provided. First, here's how to change the IN/OUT board:

On the bottom side of the board, that is, the side without the chips, locate the underside of the chip labeled U1 in the lower left corner. Pin 1 of this chip is marked. It is the bottom left connection. From this point, move up the vertical row of connections to pin 9 (one down from the top), and use a sharp knife to cut through the metallic printed circuit material which leads horizontally over to pin 11. For those who are first time hardware hackers, this process is called "cutting a trace", and what you are doing is breaking the electrical connection between pins 9 and 11. After this is done, use a soldering iron (remove the chips from their sockets before you do any soldering on the board) with a good heavy blob of solder on the tip to bridge the gap between pin 9 and pin 10 (immediately above pin 9). Make sure you don't use so much solder that you also re-connect pins 9 and 11 accidentally. That ends the necessary mods to the port board. What you did was change the address of the port from 223 decimal to 207 decimal. Instructions which come with the port describe the theory of this procedure in greater detail.

The IBM keyboard is a serial device which means that when you press a key, a stream of electric pulses representing the key you press goes out through the keyboard's data output line. This is very similar to the way that dots and dashes are sent by radio to represent a letter in Morse code. It is necessary to collect this serial stream and convert it into a parallel 8 bit word which can then be fed to the IN/OUT port's input lines. The additional circuitry shown below does this. This diagram shows the two necessary chips, the capacitor, and the way everything must be connected. It is not critical how you go about wiring everything up as long as everything goes to the right place. You should try to keep your wires as short as possible. The shorter you keep your connections, the less chance there is of introducing noise into the system which can cause faulty reading of the keyboard.

Many people prefer not to involve themselves in this kind of hardware construction. If you feel this way, but you still would like to use the IBM keyboard, I will supply you with a ready to plug in board. These circuits, however, are not mass produced. I must make each one individually. Unfortunately, the price must be set accordingly: \$89.00. This includes the port board, all additional circuitry and connections, so all you need to do is plug in the IBM keyboard. I realize that is steep, but there is just no way I can charge less for custom work. You really should take the plunge and learn how to build simple circuits like this yourself anyway. It will open up totally new aspects of the computer hobby.

Serial to Parallel Converter Circuitry



Underside of Input/Output Port showing traces of U1 which must be cut and bridged

NOW THE SOFTWARE SIDE OF THE IBM KEYBOARD

Once the hardware side is taken care of, plug the keyboard into the socket of the serial to parallel converter circuit, connect the port board to the back of the 2068, and turn on the cartridge Pro/File. It works just like before only now, you can type on the big keyboard. The many function keys of the big keyboard are used for tokens and cursor arrows which required multiple key presses on the 2068 keyboard. Here is a list of all the IBM keys and their functions. You may want to make up some small labels to stick onto the front edge of each key to remind you of what the more important keys do.

All normal ASCII keys (letters, numbers, and punctuation marks) work according to the letter shown on the key except for 2 keys. These are the apostrophe and the reverse slash which produce the same character both in upper or lower case.

On the programmable function keys:

- F1 is an AUTO REPEAT key. Hold it down to repeat the last key pressed.
- F2 produces the STEP token (Next file when in ADD/EDIT mode)
- F3 produces the STOP token (for closing a file when in ADD/EDIT mode)
- F4 Alternate between INSERT and OVER modes in ADD/EDIT
- F5 Line Delete in ADD/EDIT mode
- F6 cursor arrow LEFT
- F7 cursor arrow DOWN
- F8 cursor arrow UP
- F9 cursor arrow RIGHT
- F10 toggle command menu in ADD/EDIT mode (shift-9 on 2068 keyboard)

Other keys used:

- ESC less than or equal to sign "<="
- TAB cursor arrow RIGHT
- PAUSE up arrow for sending control codes to the printer
- PT SC Lprint command in ADD/EDIT mode (the THEN token)
- CTRL up arrow

-BACK SPACE key deletes characters

-RETURN is the same as the 2068 ENTER key

-CAPS LOCK produces Upper Case characters until it is pressed again

-SHIFT keys produce Upper Case characters until the shift key is released

The ALT key is an ALTERNATE Shift key, however its function is not to produce upper case characters. The ALT key has two main uses. The first deals with the numeric keypad. If the ALT key is NOT depressed, you can type the numbers which appear on the numeric keypad. If you press a key on this keypad and at the same time hold down the ALT key, you produce the following:

- ALT 1 produces the NOT token
- ALT 2 cursor arrow DOWN
- ALT 3 NOT token
- ALT 4 cursor arrow LEFT
- ALT 5 no effect
- ALT 6 cursor arrow RIGHT
- ALT 7 AND token
- ALT 8 cursor arrow UP
- ALT 9 OR token
- ALT 0 Line Insert (in ADD/EDIT mode)
- ALT . Line Erase (in ADD/EDIT mode)

The second purpose for the ALT key is to provide you with a way to customize the keyboard for your own purposes. You can press ALT in conjunction with any desired key and make it represent any character you wish. This is done by creating a special ALTERNATE key table in the Home bank of memory and using the characters found there when you press ALT simultaneously with some other key. When the computer first starts up, it fills this table with the same characters as the normal table which is stored in the cartridge. This creates the illusion that ALT has no effect at the beginning except when it is used with the numeric keypad. You can, however POKE bytes of the ALTERNATE table with the code representing the character you wish to produce. The following table gives the addresses to poke for the corresponding key on the IBM keyboard.

Address	IBM Key	Address	IBM Key	Address	IBM Key	Address	IBM Key
23757	ESC	23778	u	23799	\	23820	F6
23758	1	23779	i	23800	z	23821	F7
23759	2	23780	o	23801	x	23822	F8
23760	3	23781	p	23802	c	23823	F9
23761	4	23782	[	23803	v	23824	F10
23762	5	23783	]	23804	b	23825	NUM LOCK
23763	6	23784	RETURN	23805	n	23826	not used
23764	7	23785	CTRL	23806	m	23827	HOME
23765	8	23786	a	23807	,	23828	Cur UP
23766	9	23787	s	23808	.	23829	Pg up
23767	0	23788	d	23809	/	23830	-
23768	-	23789	f	23810	not used	23831	Cur LEFT
23769	=	23790	g	23811	Pr Scr	23832	Alt 5
23770	Back Sp	23791	h	23812	not used	23833	Cur RIGHT
23771	TAB	23792	j	23813	Space	23834	+
23772	q	23793	k	23814	not used	23835	End
23773	w	23794	l	23815	not used	23836	Cur DOWN
23774	e	23795	;	23816	F2	23837	Pg DOWN
23775	r	23796	'	23817	F3	23838	Ins
23776	t	23797	`	23818	F4	23839	Del
23777	y	23798	not used	23819	F5		

The addresses below give keys in the UPPER CASE mode. They are accessed by pressing SHIFT and ALT simultaneously with some other key.

23841	ESC	23862	U	23883	I	23904	F6
23842	!	23863	I	23884	Z	23905	F7
23843	@	23864	O	23885	X	23906	F9
23844	#	23865	P	23886	C	23907	F9
23845	\$	23866	(	23887	V	23908	F10
23846	%	23867	)	23888	B	23909	NUM LOK
23847	^	23868	RETURN	23889	N	23910	not used
23848	&	23869	CTRL	23890	M	23911	HOME
23849	*	23870	A	23891	<	23912	CUR UP
23850	(	23871	S	23892	>	23913	PAGE UP
23851	)	23872	D	23893	?	23914	-
23852	-	23873	F	23894	not used	23915	CUR LEFT
23853	+	23874	G	23895	PR SCR	23916	5
23854	Back Sp	23875	H	23896	not used	23917	CUR RIGHT
23855	TAB	23876	J	23897	SPACE	23918	+
23856	Q	23877	K	23898	not used	23919	END
23857	W	23878	L	23899	not used	23920	CUR DOWN
23858	E	23879	:	23900	F2	23921	PG DOWN
23859	R	23880	"	23901	F3	23922	INSERT
23860	T	23881	~	23902	F4	23923	DELETE
23861	Y	23882	not used	23903	F5		

Here is an example of how you might alter this table. Say you want to make it possible to produce the AND token whenever you press ALT and F10 together. What you must do is determine the code for the AND token. You'll find the code listed on page 244 of the 2068 owner's manual. The table printed there shows that the number 198 is the code for AND. Now refer to the table above and change the address representing F10 so that it stores the value 198. If Pro/File is running, you must first stop it by pressing SHIFT 1, STOP, and ENTER. Then enter the command:

```
POKE 23824,198
```

to change the value representing the F10 key. Go back into Pro/File by entering the command GO TO 1. Now, any time you press F10 and ALT together, you will get the token AND. This works as long as you are in lower case. If you want F10 to respond the same way in upper case as well, you must also POKE 23908 with a 198.

USE THE KEYBOARD WITH YOUR OWN BASIC PROGRAMS

The keyboard software is designed so it can be used in your own programs, not just with Pro/File. This is done by setting up a new keyboard channel (channel #4) which will read the IBM keyboard. This means that you can use INPUT #4 or INKEY\$ #4 to access the big keyboard.

Use the "<=" command already discussed to exit from Pro/File. This will leave you in the Home bank of memory. Enter the Basic CLEAR command to clear out all of Pro/File's data space, and then type in or MERGE your Basic program. It is important that you use MERGE here (not LOAD) because you do not want to lose the funny looking REM line which you'll see after you exit Pro/File. This rem line stores important information used by the computer to determine where to find the keyboard software. This REM line MUST be present in your Basic program if you want to be able to read the big keyboard. Do not delete it, do not wipe it out by using the LOAD command, and when you use MERGE, make sure that the program you're trying to merge doesn't already have a line 1, or it will replace the line created by the cartridge.

Anyway, once you have your Basic in the computer, and the line 1 is incorporated into it, all you have to do is go through your listing and change every input and inkey command to INPUT #4; and INKEY\$ #4.

A few examples of correct syntax are:

```
100 LET A$=INKEY$ #4
110 INPUT #4;B$
120 INPUT "Make Your Selection";#4;A$
130 INPUT #4;"Make Your Selection";A$
```

As long as the Pro/File cartridge is plugged in, and you have the Line 1 REM in your program, the big keyboard will be read while your program is running. When you stop to edit program lines, the IBM does not function. You must use the 2068 keyboard.

PEEKING INTO THE CARTRIDGE PROGRAM

Explaining every minute detail of how the cartridge Pro/File is beyond the scope of these instructions. Instead of going into it here, I will show you how to look at the cartridge basic, and tell you where the machine code is located. If you are interested in reading more about Pro/File's bank switching method, this subject shall be presented in the Computer Updates Newsletter which I publish.

Most cartridge type programs are impossible to List even though they may be written completely in Basic. This is because the Basic is stored in an Eprom rather than in the normal RAM memory. In the case of Pro/File, however, special programming was added to enable you to view the listing on the TV screen in a very crude sort of way, but at least it is possible to see it. When you have the main menu on the screen, stop the program's execution by pressing SHIFT 1, STOP, and ENTER. Then enter the command, RUN 9998. This will produce a report 9 at the bottom of the screen, after which you can press ENTER a second time to produce the program listing.

When the computer runs line 9998, it is fooled into thinking that the cartridge is really RAM memory. This allows you to read the memory, and the computer will try to write to it. But since we are looking at Eprom, this is quite impossible. The result is the keyboard will not appear to function properly if you try to type any commands. The only keys which will work are the cursor edit keys. Press them to view different portions of the program listing.

Only Pro/File's Basic may be listed in this way. The other half of the program--the machine code--can be transferred into the home bank and saved onto tape for subsequent reloading into a disassembler. Pro/File's code is located in two separate areas: addresses 47057 to 48836 and 49056 to 49151.

A&J MICRODRIVE NOTES

If you use the microdrive stringy floppy, you can add these lines to the home bank of memory to save or load files. When the Pro/File main menu comes on the screen, use the "<=" command to go to the home bank. Then add the following listing:

```
10 IF X$="<=SAVE" OR Y$="<=SAVE" THEN SAVE "@1,FILE" LINE 1000
20 IF X$="<=LOAD" OR Y$="<=LOAD" THEN LOAD "@FILE"
1000 POKE 23750,128: GO TO 1
```

When you're finished, enter the command GO TO 1000 to go back to Pro/File. Now, when you want to save a file onto a wafer, type the command "<=SAVE". This will save your data and the home bank program lines shown above.

When you want to load the file back into the computer, there are two methods to choose from. If you have just turned the computer on, use the "<=" command to go to the home bank. Then enter the command: LOAD "@FILE". This will load your data, and the program lines above into the computer. Once these lines have been loaded, you can use the "<=LOAD" command directly from the Pro/File main menu to load subsequent files.

LOADING DATA FROM YOUR OLD PRO/FILE INTO YOUR NEW CARTRIDGE PRO/FILE

If you have records created by the cassette version of Pro/File which you would like access with this new cartridge program, here is how to do it.

1. Load your copy of Pro/File which contains the data you wish to adapt to the cartridge.
2. When the main menu comes up on the screen, break into the program listing by pressing SHIFT 1, STOP, and ENTER.
3. Change the Basic line 107 so that it appears exactly like that shown here:

```
107 IF X$="SAVE" THEN LET D$(6 TO 7)=STR$  
0 5)=STR$ P: LET D$(6 TO 7)=STR$  
LEN F$: LET D$(8 TO 7+LEN F$)=F  
$: SAVE F$CODE (PEEK 23627+256*P  
EEK 23628+6),P: STOP
```

4. After double checking the new line 107, use the GO TO 1 command to start Pro/File working again.
5. When the main menu is displayed, enter "SAVE" just as you do when you want to save your data. This time, however, your records will go onto the tape in the proper format so that they can be loaded (or merged) into the cartridge version of the program.
6. It is advised that you use a new cassette when you make this save. This reduces the risk of your accidentally erasing the old tape version. After the save is finished, the computer will stop with a REPORT 9. You can now turn off your recorder and rewind the tape.
7. Turn your computer off, insert the Pro/File cartridge, and turn the computer back on again. When the main menu is shown on the screen, you can enter the LOAD command to load your old data into your new program.

I should also repeat that you can use the MERGE function to load your data with equal results. Because the cartridge program gives you more data capacity, you may wish to consolidate several of your smaller files into one big file by using MERGE rather than LOAD.

OLIGER DISK DRIVE NOTES

I have had very good luck using this cartridge Pro/File in conjunction with a disk interface manufactured by the John L. Oliger Co. With it, you can have 8 different files per disk with double sided double density drives. Saving or Loading to/from the disk takes just 4 seconds!

What follows is one method I devised for incorporating the disk system with Pro/File. There are many other ways you could do this. Use the method here to get you started.

First, get the Pro/File main menu on the screen and quit to the home bank using "<=" as a search command. Then add these three lines of Basic:

```
10 IF X$="<=LOAD" THEN LOAD
20 IF X$("<=SAVE" THEN STOP
30 SAVE /1: POKE 23750,128: GO TO 1
```

Now save this onto disk and go back to the main menu by entering the command GO TO 30.

When the main menu comes up, quit to the home bank again by entering "<=" as a search command. Edit line 30 so that it says "SAVE /2....", and repeat the process of saving and returning to Pro/File by using GO TO 30. Do this eight times so that 8 copies of Pro/File will be saved onto the disk.

After the eighth save, reset the computer by turning it off, then on again. Next, create a directory program which will be saved to the first sector of the disk. Accomplish this by quitting to the home bank again using the <= search command, and adding this basic listing to the rem line which stores the channel information:

```
30 CLEAR : PRINT "DIRECTORY":
PRINT : PRINT " FILE 1",," FILE
2",," FILE 3",," FILE 4",," FILE
5",," FILE 6",," FILE 7",," FIL
E 8"
35 LET Y=VAL "2"
39 PRINT AT Y,NOT PI;" ": LET
Y$=INKEY$+INKEY$#VAL "4": LET Y=
Y+(Y$=CHR$ VAL "10")-(Y$=CHR$ VA
L "11"): IF Y>VAL "9" OR Y<VAL "
2" THEN LET Y=VAL "2"
40 PRINT AT Y,NOT PI;">"
50 IF Y$("<=CHR$ VAL "13" THEN G
O TO VAL "39"
60 LET Y=Y-PI/PI: LOAD /Y
```

Once this is done type CLEAR and ENTER. Lastly, enter the command SAVE /0 to save this program onto the disk.

Your disk is now complete. You have the directory program along with 8 empty copies of Pro/File. To use this system, immediately after turning your computer on, quit to the home bank and type LOAD to get your directory. The directory program will come up running automatically. The screen will list the 8 file names you entered into line 30. A cursor will blink beside the first file name. You can move this cursor to any of the others in the list by pressing the up or down cursor arrows on the keyboard. When the cursor is beside the file you want to load, press ENTER. This loads the file from disk.

When you have a Pro/File in your computer which needs to be saved, enter the command "<=SAVE" at the main menu. Data will be sent to the disk. When the save is finished, you return to the main menu.

You can also load other files from the disk by entering "<=LOAD" at the main menu.

WRAP-UP

In making this cartridge Pro/File, I have tried to combine the big advantage of running a program from cartridge and the flexibility of still being able to add new features by adding them to RAM. I must admit that I am just delighted with the way it has turned out. Hopefully, you will be too. If you have any comments, suggestions, or criticisms pertaining to the program, please send them in. I plan to write more about the cartridge Pro/File in Computer Updates newsletter. I hope to include as much of what users provide as possible. If you are interested in finding out more about how this program works, I urge you to subscribe to Updates. The newsletter comes out 4 times a year. A subscription costs \$12.95 and is available from me, Thomas B. Woods, P.O. Box 64, Jefferson, NH 03583. Finally, I would like to thank all of you for expressing your continued support for Timex Sinclair products and for suggesting ways to improve the cassette version of Pro/File 2068. Also, two individuals deserve special recognition for their help in making this latest cartridge version what it is: P.H. Skipper, Robert C. Fischer. Thank you.